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	)	
John Yates	)	Before the Examiner
	)	Jackson, Andre
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	)	Group Art Unit 3677
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SAFETY BELT WEB ADJUSTER	)	

REQUEST FOR REPUBLICATION

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Applicant requests republication of the above-identified patent application. Enclosed is a copy of the application reflecting all amendments to date in compliance with the Office electronic filing system requirements along with the $300.00 publication fee set forth in § 1.18(d) and the $130.00 processing fee set forth in § 1.17(i). Please charge any additional fees or credit any overpayment to Deposit Account No. 23-3030.

Respectfully submitted,

By: _____

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SAFETY BELT WEB ADJUSTER

TECHNICAL FIELD OF THE INVENTION

The present invention generally relates to safety belts for motor vehicles and, more particularly, to a safety belt web adjuster.

BACKGROUND OF THE INVENTION

As is known in the art, safety belts are commonly used in vehicle interiors in order to limit movement of the belted occupant in the event of sudden vehicle movements, particularly accidents in which the car experiences a violent collision with another stationary or moving object. Because of the generally higher speeds and the competitive nature of the driving, safety belts for racing cars are generally designed for greater protection of the belted occupant than are safety belts for general vehicular use.

Safety belts of the type generally used in vehicles include a webbing material (such as woven nylon, for example) anchored to the vehicle and formed into a protective harness for the vehicle occupant using various pieces of safety belt hardware. One such common piece of safety belt hardware is the web adjuster, which is used to allow slack in the safety belt to be taken up or added in order to ensure that the safety belt snugly conforms to the size of the current vehicle occupant. FIG. 1 schematically illustrates a typical prior art safety belt web adjuster, indicated generally at 10.

The prior art web adjuster 10 generally comprises a relatively flat member having three horizontal members 12, 14 and 16 coupled by two vertical members 18 and 20,

such that the horizontal member 14 is positioned between the horizontal members 12 and 16. As used herein, the terms "horizontal" and "vertical" are merely indicators of relative positioning between various objects, and are not intended to signify any position with respect to the ground. The web adjuster 10 may be made of any suitably strong material, and is generally formed from metal.

FIG. 2 illustrates the prior art web adjuster 10 of FIG. 1 in use with a safety belt. FIG. 2 assigns the labels "upper," "lower," posterior" and "anterior" to four relative directions for ease of discussing the positioning of various portions of FIG. 2, but again these directions are not intended to signify any position with respect to the ground. The web adjuster 10 is used to adjustably couple two sections of safety belt webbing, namely a first section 22 and a second section 24, such that the combined length of the two sections 22 and 24 can be changed in order to fit the safety belt snugly against vehicle occupants of differing sizes. The first section 22 of webbing is looped around the horizontal member 12 and secured thereto by threads 26 sewing the two sections of webbing 22 together, as is known in the art. The other end of webbing section 22 is coupled to a suitable anchor point 27, typically to the chassis of the vehicle.

The lower section of webbing 24 is looped around the horizontal member 14; however, the two portions 28 and 30 of webbing section 24 are not coupled by any sewn threads, and remain free to move with respect to one another in certain situations, as explained in greater detail hereinbelow. As can be seen from the drawing, both portions 28 and 30 of the webbing section 24 lie on the posterior side of horizontal member 16. The portion 28 is coupled to a suitable anchor point 31, typically to the chassis of the vehicle, while the portion 30 remains unattached.

In use, the safety belt web adjuster 10 allows the section of safety belt webbing into which it is installed to be adjusted to fit vehicle occupants of various sizes. For example, if the vehicle occupant installs the safety belt and determines that it does not fit snugly enough, then slack may be removed therefrom by grasping the portion 30 of the webbing section 24 and pulling the portion 30 towards the lower direction. This will have the effect of lengthening the portion 30 and shortening the portion 28, thereby removing slack from the combined length of the webbing sections 22 and 24.

Once this slack has been removed in sufficient quantity to force the safety belt to lie snugly against the vehicle occupant, the safety belt will be placed in tension, with the safety belt sections 22 and 24 being pulled away from one another. This will cause the safety belt section 22 to bear against the lower side of horizontal member 12, while the safety belt section 24 bears against the upper side of horizontal member 14. Furthermore, the portion 30 bears against the upper edge of horizontal member 16 as it passes thereby. The looping of safety belt section 24 through the horizontal members 14 and 16 under tension prevents any further relative motion between the portions 28 and 30, and therefore prevents any further relative motion between the webbing sections 22 and 24, thereby maintaining the level of safety belt snugness set by the vehicle occupant. Adding slack to the safety belt may be done by moving the webbing portion 28 toward the lower direction.

One drawback of the prior art web adjuster 10 is that the webbing can bunch to the side within the adjuster 10 when the safety belt is not under proper tension. Furthermore, relatively large pulling forces are required in order to adjust the slack of the safety belt using the prior art web adjuster 10. There therefore remains a need for

improvement in the field of safety belt web adjusters. The present invention is directed toward meeting this need.

SUMMARY OF THE INVENTION

The present invention is directed toward a safety belt web adjuster that incorporates a sliding middle horizontal member around which the lower section of webbing is looped. This allows the webbing section to be trapped between two bars, one sliding and one fixed. The web adjuster of the present invention also allows for relatively easy adjustment of safety belt tension by moving the web adjuster through approximately 90 degrees of motion, thereby removing the bearing force on the webbing previously supplied by the fixed member, allowing the slack in the safety belt to be easily adjusted.

In one embodiment of the present invention, a safety belt web adjuster is disclosed, comprising a first horizontal member having first and second ends; a second horizontal member having third and fourth ends; a first vertical member extending between the first and third ends; a second vertical member extending between the second and fourth ends; a first ear extending away from the junction between the second horizontal member and the first vertical member; and a second ear extending away from the junction between the second horizontal member and the second vertical member; and a third horizontal member having a first substantially c-shaped end and a second substantially c-shaped end; wherein the first substantially c-shaped end engages the first vertical member; wherein the second substantially c-shaped end engages the second vertical member; and wherein the third horizontal member is free to slide between the first and second horizontal members while engaging the first and second vertical members.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a prior art web adjuster.

FIG. 2 is a partial cross-sectional view of the prior art web adjuster of FIG. 1 installed on two sections of safety belt webbing.

FIG. 3 is a plan view of a preferred embodiment web adjuster of the present invention.

FIG. 4 is a cross-sectional view of the web adjuster of FIG. 3.

FIG. 5 is a partial cross-sectional view of the web adjuster of FIG. 3 installed on two sections of safety belt webbing.

FIG. 6 is a partial cross-sectional view of the web adjuster of FIG. 3 installed on two sections of safety belt webbing, illustrating a preferred adjustment position of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, and alterations and modifications in the illustrated device, and further applications of the principles of the invention as illustrated therein are herein contemplated as would normally occur to one skilled in the art to which the invention relates.

FIG. 3 illustrates a preferred embodiment web adjuster of the present invention, indicated generally at 100. The web adjuster 100 generally comprises a relatively flat member having two horizontal members 102 and 104 coupled by two vertical members 106 and 108. A first ear 110 is formed at the junction between horizontal member 104 and vertical member 106, while a second ear 112 is formed at the junction between horizontal member 104 and vertical member 108. The purpose of ears 110 and 112 will be illustrated hereinbelow. An opening 114 is preferably formed in the central portion of horizontal member 104. The purpose of the opening 114 will also be illustrated hereinbelow.

As shown in FIGs. 3 and 4, a third horizontal member 116 is provided. The horizontal member 116 comprises a relatively flat section 118 joining two relatively c-shaped ends 120 and 122. The c-shaped ends 120 and 122 allow the horizontal member 116 to slide freely over the vertical members 106 and 108, as shown in the drawings. When installed in a safety belt as described hereinbelow, the horizontal member 116 is positioned between the horizontal members 102 and 104. As used herein, the terms

"horizontal" and "vertical" are merely indicators of relative positioning between various objects, and are not intended to signify any position with respect to the ground. The web adjuster 100 may be made of any suitably strong material, and is preferably formed from an appropriately high strength material, such as steel or forged aluminum, for example.

FIGs. 5 and 6 illustrate the web adjuster 100 of the present invention in use with a safety belt. FIGs. 5 and 6 assign the labels "upper," "lower," posterior" and "anterior" to four relative directions for ease of discussing the positioning of various portions of FIGs. 5 and 6, but again these directions are not intended to signify any position with respect to the ground. The web adjuster 100 is used to adjustably couple two sections of safety belt webbing, namely a first section 124 and a second section 126, such that the combined length of the two sections 124 and 126 can be changed in order to fit the safety belt snugly against vehicle occupants of differing sizes. The first section 124 of webbing is looped around the horizontal member 102 and secured thereto by threads 128 sewing the two sections of webbing 124 together, as is known in the art. The webbing section 124 is coupled to a suitable anchor point 130, typically to the chassis of the vehicle.

The lower section of webbing 126 is looped around the horizontal member 116; however, the two portions 132 and 134 of webbing section 126 are not coupled by any sewn threads, and remain free to move with respect to one another in certain situations, as explained in greater detail hereinbelow. As can be seen from the drawing, both portions 132 and 134 of the webbing section 126 lie on the posterior side of horizontal member 104. The portion 132 is coupled to a suitable anchor point 136, typically to the chassis of the vehicle, while the portion 134 remains unattached. Preferably, a material tab 138 is looped through the opening 114 and its two ends are sewn together with thread 140. The

provision of the tab 138 facilitates grasping of the web adjuster 100 during safety belt adjustment procedures, as described in greater detail hereinbelow.

In use, the safety belt web adjuster 100 allows the section of safety belt webbing into which it is installed to be adjusted to fit vehicle occupants of various sizes. For example, if the vehicle occupant installs the safety belt and determines that it does not fit snugly enough, then slack may be removed therefrom by grasping the portion 134 of the webbing section 126 and pulling the portion 134 towards the lower direction. This will have the effect of lengthening the portion 134 and shortening the portion 132, thereby removing slack from the combined length of the webbing sections 124 and 126. The adjustment of the safety belt using the web adjuster 100 of the present invention is described in greater detail hereinbelow with respect to FIG. 6.

Once this slack has been removed in sufficient quantity to force the safety belt to lie snugly against the vehicle occupant, the safety belt will be placed in tension, with the safety belt sections 124 and 126 being pulled away from one another. This will cause the safety belt section 124 to bear against the lower side of horizontal member 102, while the safety belt section 126 bears against the upper side of horizontal member 116. Furthermore, because the horizontal member 116 is free to slide over the length of the vertical members 106 and 108, placing the safety belt in tension causes the horizontal member 116 to slide toward the lower direction, entrapping the portion 134 of the webbing section 126 between the horizontal member 116 and the horizontal member 104. Therefore, the portion 134 is sandwiched under tension between the horizontal members 116 and 104, and also bears against the upper posterior edge of horizontal member 104 as it passes thereby. The looping of safety belt section 126 through the horizontal members

116 and 104 under tension , and the sliding of the horizontal member 116 toward horizontal member 104, prevents any further relative motion between the portions 132 and 134, and therefore prevents any further relative motion between the webbing sections 124 and 126, thereby maintaining the level of safety belt snugness set by the vehicle occupant. It will be appreciated that the ears 110 and 112 facilitate retention of the sliding horizontal member 116 while the web adjuster 100 is first being installed upon the safety belt (i.e. before the webbing section 126 has been looped therethough.

Adding slack to the safety belt may be done by moving the webbing portion 134 toward the lower direction; however, this may be difficult to do when the safety belt is under tension, as the sliding horizontal member 116 is exerting a force toward the horizontal member 104, thereby sandwiching the webbing portion 134 therebetween. As illustrated in FIG. 6, adjustment of the web adjuster 100 is facilitated by rotating the web adjuster 100 through approximately 45° to 135°, and preferably through 90°, from the upper/lower plane to lie in the posterior/anterior plane. Provision of the tab 138 facilitates grasping of the web adjuster 100 by the vehicle occupant, particularly when the vehicle occupant is wearing gloves as would normally be the case in a racing application.

As shown in FIG. 6, the user has grasped the tab 138 and pulled the web adjuster 100 toward the upper direction, thereby rotating the web adjuster 100 through approximately 90° and into the posterior/anterior plane. In this position, there is no longer a tension force acting on the sliding horizontal member 116 tending to force it toward the horizontal member 104. Without this force acting on horizontal member 116, horizontal member 116 is free to slide in the posterior direction away from horizontal member 104. Now that the webbing section 126 is no longer sandwiched between

horizontal members 116 and 104, it is much easier to adjust the slack of the safety belt by moving the webbing portion 134 with respect to the webbing portion 132. It will be appreciated that the ability of horizontal member 116 to slide freely along vertical members 106 and 108 is critical to the ability of web adjuster 100 to be easily adjusted when in the position illustrated in FIG. 6. Once the slack has been adjusted as desired, the vehicle occupant simply releases his grip on the tab 138 and the web adjuster will automatically return to the position illustrated in FIG. 5.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected.

What is claimed:

1. A safety belt web adjuster for use with a safety belt web, said safety belt web adjuster comprising:

a first horizontal member having first and second ends;

a second horizontal member having third and fourth ends;

a first vertical member having a top surface and a bottom surface extending between the first and third ends;

a second vertical member having a top surface and bottom surface extending between the second and fourth ends;

a first ear extending away from the junction between the second horizontal member and first vertical member;

a second ear extending away from the junction between the second horizontal member and the second vertical member; and

a third horizontal member having a first substantially c-shaped end and a second substantially c-shaped end, the third horizontal member having no teeth or knurling, wherein the first substantially c-shaped end engages the first vertical member around the top and bottom surfaces and wherein the second substantially c-shaped end engages the second vertical member around the top and bottom surfaces;

wherein the third horizontal member is free to slide between the first and second horizontal members;

wherein the first ear and the second ear prevent the third horizontal member from sliding past the second horizontal member; and

wherein the third horizontal member can slide over the first horizontal member while engaging the first and second vertical members.

2. A safety belt apparatus comprising:

a web adjuster comprising:

a first horizontal member having first and second ends;

a second horizontal member having third and forth ends;

a first vertical member having a top surface and a bottom surface extending between the first and third ends;

a second vertical member having a top surface and bottom surface extending between the second and fourth ends;

a third horizontal member having a first substantially c-shaped end and a second substantially c-shaped end;

wherein the first substantially c-shaped end engages the first vertical member around both the top and bottom surfaces;

wherein the second substantially c-shaped end engages the second vertical member around both the top and bottom surfaces; and

wherein the third horizontal member is free to slide between the first and second horizontal members;

a first web affixed to the first horizontal member; and

a second web looped around the third horizontal member;

wherein tension on the second web generates a clamping force between the third horizontal member and the second horizontal member that substantially prevents loosening the web adjuster relative to the second web unless the clamping force is reduced by rotating the web adjuster at least 45 degrees from an upper/lower plane orientation.

3. The safety belt apparatus of claim 2, wherein the clamping force between the third horizontal member and the second horizontal member substantially prevents loosening the web adjuster relative to the second web unless the clamping force is reduced by rotating the web adjuster at least 90 degrees from the upper/lower plane orientation.

4. A safety belt apparatus comprising:

a web adjuster comprising:

a first horizontal member having first and second ends;

a second horizontal member having third and forth ends, the second horizontal member having a configuration;

a first vertical member having a top surface and a bottom surface extending between the first and third ends;

a second vertical member having a top surface and bottom surface extending between the second and fourth ends;

a third horizontal member having a first substantially c-shaped end and a second substantially c-shaped end;

wherein the first substantially c-shaped end engages the first vertical member around both the top and bottom surfaces;

wherein the second substantially c-shaped end engages the second vertical member around both the top and bottom surfaces;

wherein the third horizontal member is free to slide between the first and second horizontal member;

wherein the configuration of the second horizontal member prevents said third horizontal member from sliding past the second horizontal member; and

wherein the first horizontal member fits through the first and second substantially c-shaped ends of the third horizontal member;

a first strap affixed to the first horizontal member; and

a second strap girded around the third horizontal member.

5. The safety belt apparatus of claim 4, wherein the third horizontal member has a substantially rectangular cross section that is substantially uniform between the first and second substantially c-shaped ends.

6. The safety belt apparatus of claim 4, wherein the web adjuster is substantially flat.

7. The safety belt apparatus of claims 4, wherein the first and second vertical members and the first and second horizontal members are coplanar and the third horizontal member is not coplanar with the first and second vertical members and the first and second horizontal members.

8. The safety belt apparatus of claim 4, wherein tension on the second strap generates a clamping force on the second strap between the third horizontal member and the second horizontal member that substantially restrains the web adjuster in position relative to the second strap unless the clamping force is reduced by rotating the web adjuster at least 45 degrees from a relative upper/lower plane orientation.

9. The safety belt apparatus of claim 8, wherein the web adjuster is restrained in position relative to the second strap unless the clamping force is reduced by rotating the web adjuster at least 90 degrees from the relative upper/lower plane orientation.

10. The safety belt apparatus of claim 4, wherein one end of the second strap is coupled to a chassis of a racing vehicle.

11. The safety belt web adjuster of claim 1, wherein tension on the safety belt generates a clamping force between the third horizontal member and the second horizontal member that substantially prevents movement of the web adjuster on the safety belt unless the clamping force is reduced by rotating the web adjuster at least 45 degrees from an upper/lower plane orientation.

12. The safety belt web adjuster of claim 11, wherein the position of the web adjuster on the safety belt can be adjusted only if the clamping force is reduced by rotating the web adjuster at least 90 degrees from the upper/lower plane orientation.

13. The safety belt web adjuster of claim 1, wherein the web adjuster is relatively flat.

14. The safety belt web adjuster of claim 1, wherein the first and second horizontal members are coplanar and the third horizontal member is not coplanar with the first or second horizontal members.

15. The safety belt web adjuster of claim 14, wherein the first and second substantially c-shaped ends of the third horizontal member are configured to permit the third horizontal member to move in a direction perpendicular to the plane of the first and second horizontal members.

16. The safety belt apparatus of claim 2, wherein the second horizontal member is configured to prevent the third horizontal member from sliding past the second horizontal member and wherein the third horizontal member can be installed over the first horizontal member.

17. The safety belt apparatus of claim 2, wherein one end of the second web is affixed to a chassis of a vehicle.

18. The safety belt web adjuster of claim 2, wherein the first and second substantially c-shaped ends of the third horizontal member are configured to permit the third horizontal member to move in a direction perpendicular to the plane of the first and second horizontal members.

19. The safety belt apparatus of claim 2, wherein the first and second horizontal members and the first and second vertical members define an opening in the web adjuster and wherein the third horizontal member does not enter the opening in the web adjuster.

20. A web adjuster for adjusting the effective length of a web under tension, said web adjuster comprising:

a first horizontal member having first and second ends;

a second horizontal member having third and fourth ends;

a first vertical member having a top surface and a bottom surface extending between the first and third ends;

a second vertical member having a top surface and bottom surface extending between the second and fourth ends; and

a third horizontal member having a first substantially c-shaped end and a second substantially c-shaped end, wherein the first substantially c-shaped end engages the first vertical member around the top and bottom surfaces and wherein the second substantially c-shaped end engages the second vertical member around the top and bottom surfaces, wherein the third horizontal member is free to slide between the first and second

horizontal members and wherein the third horizontal member is not coplanar with the first and second horizontal members;

wherein tension on the web generates a clamping force on the web between the third horizontal member and the second horizontal member that prevents movement of the web adjuster in the direction that reduces tension on the web unless the clamping force is reduced by rotating the web adjuster at least 45 degrees from an orientation of the web at the location of the web adjuster.

21. The web adjuster of claim 20, wherein movement of the web adjuster in the direction that reduces tension on the web can be made only if the clamping force is reduced by rotating the web adjuster at least 90 degrees from the orientation of the web.

22. The web adjuster of claim 20, wherein the third horizontal member cannot slide past said second horizontal member and wherein the third horizontal member can slide over the first horizontal member.

23. The web adjuster of claim 20, wherein the web adjuster is relatively flat.

24. The web adjuster of claim 20, wherein the first and second substantially c-shaped ends of the third horizontal member are configured to permit the third horizontal member to move in a direction perpendicular to the plane of the first and second horizontal members.

ABSTRACT OF THE DISCLOSURE

The present invention is directed toward a safety belt web adjuster that incorporates a sliding middle horizontal member around which the lower section of webbing is looped. This allows the webbing section to be trapped between two bars, one sliding and one fixed. The web adjuster of the present invention also allows for relatively easy adjustment of safety belt tension by moving the web adjuster through approximately 90 degrees of motion, thereby removing the bearing force on the webbing previously supplied by the fixed member, allowing the slack in the safety belt to be easily adjusted.

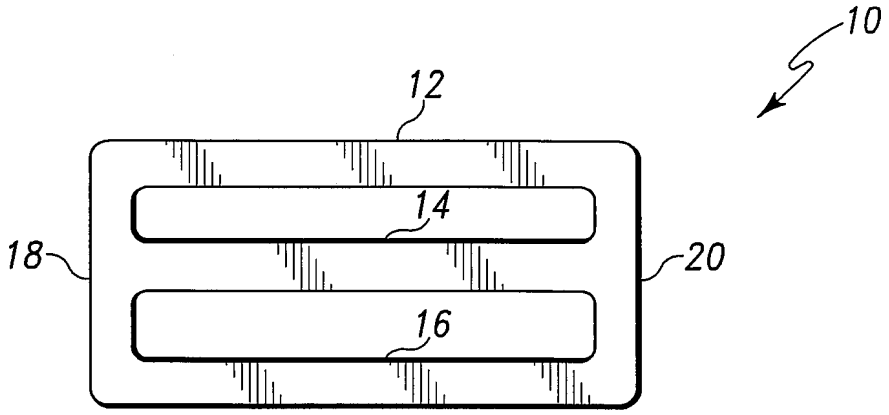


Fig. 1
(Prior Art)

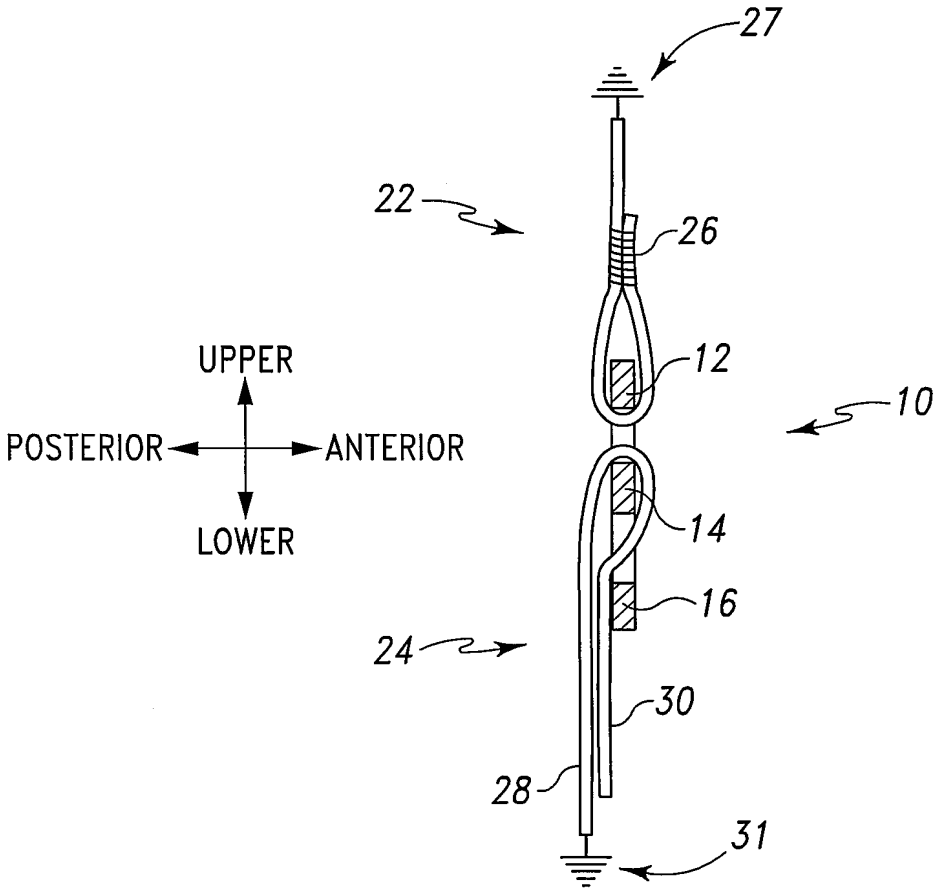
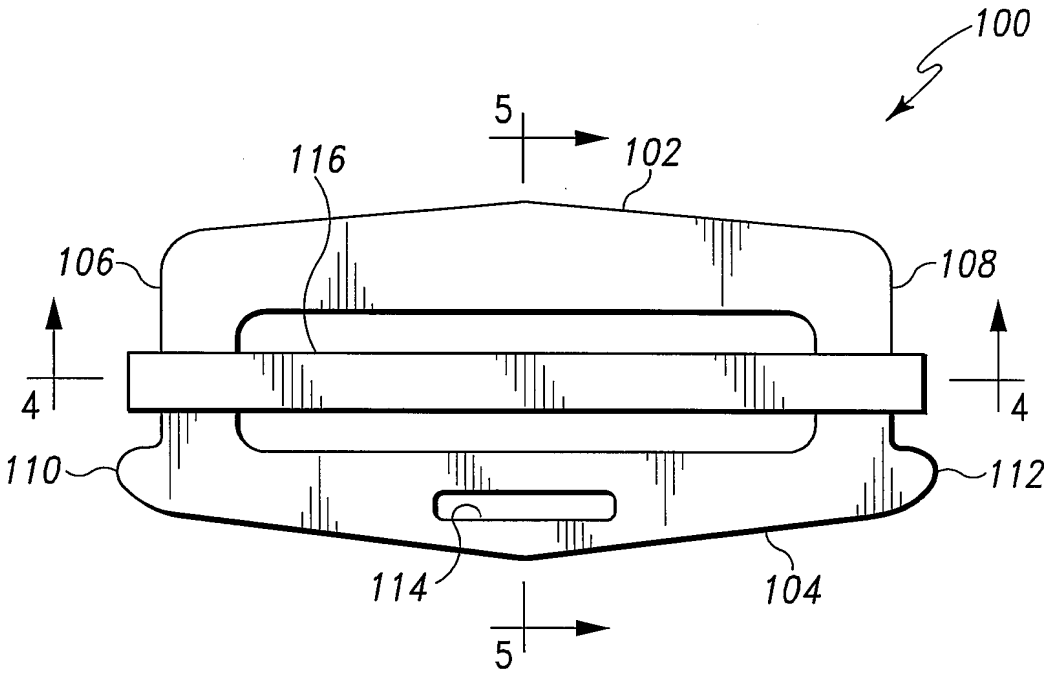


Fig. 2
(Prior Art)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102
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4
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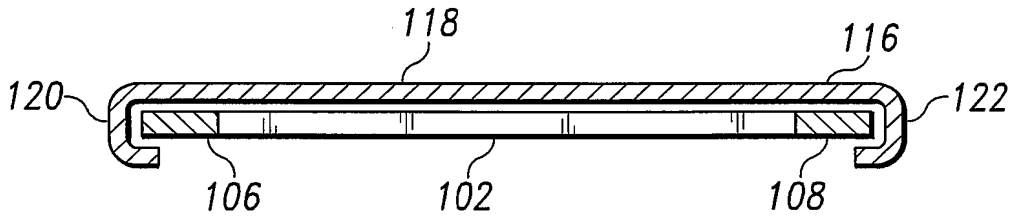
5

Fig. 3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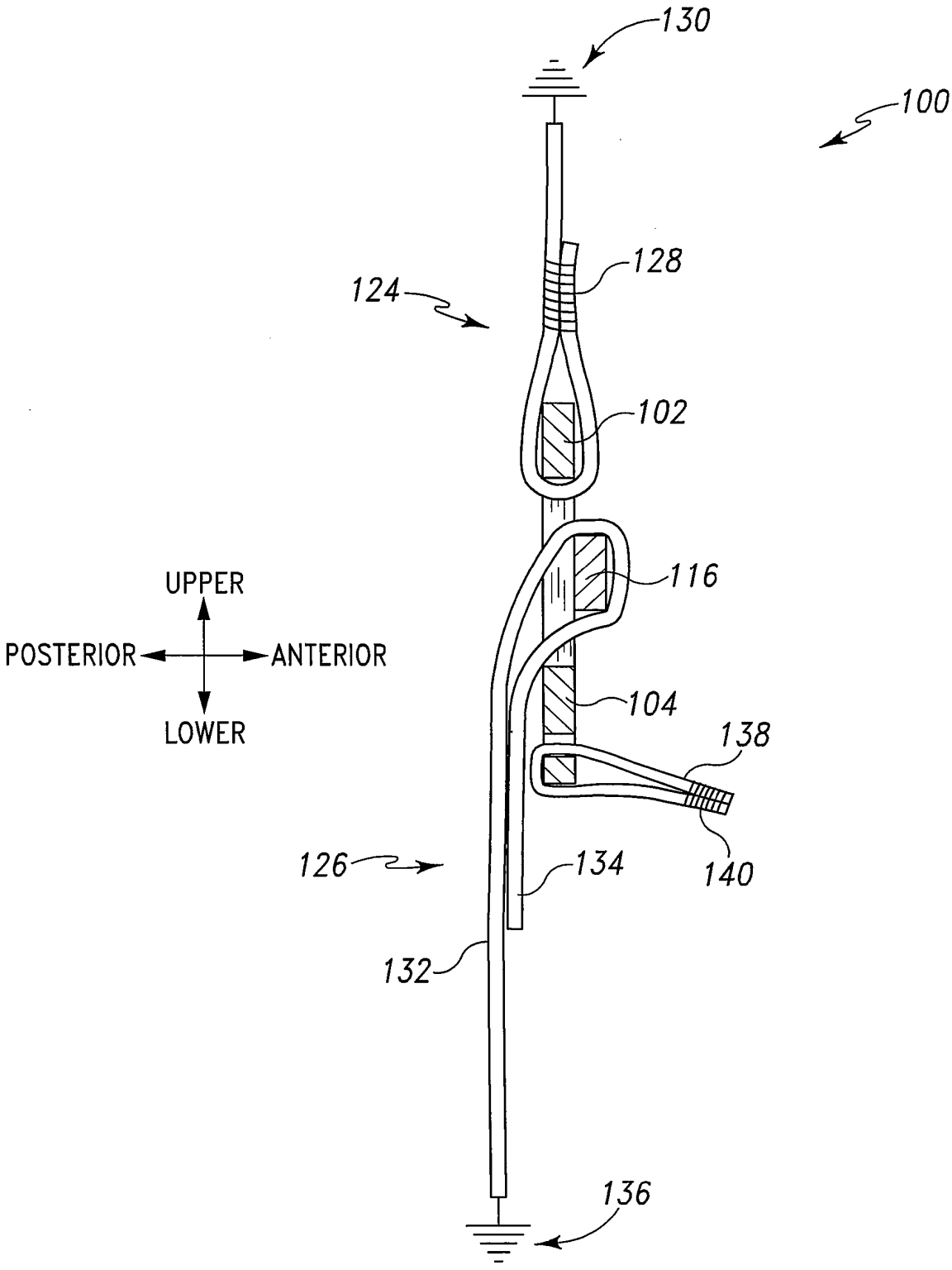
106
102
108

Fig. 4


130
100
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116
UPPER
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136

Fig. 5

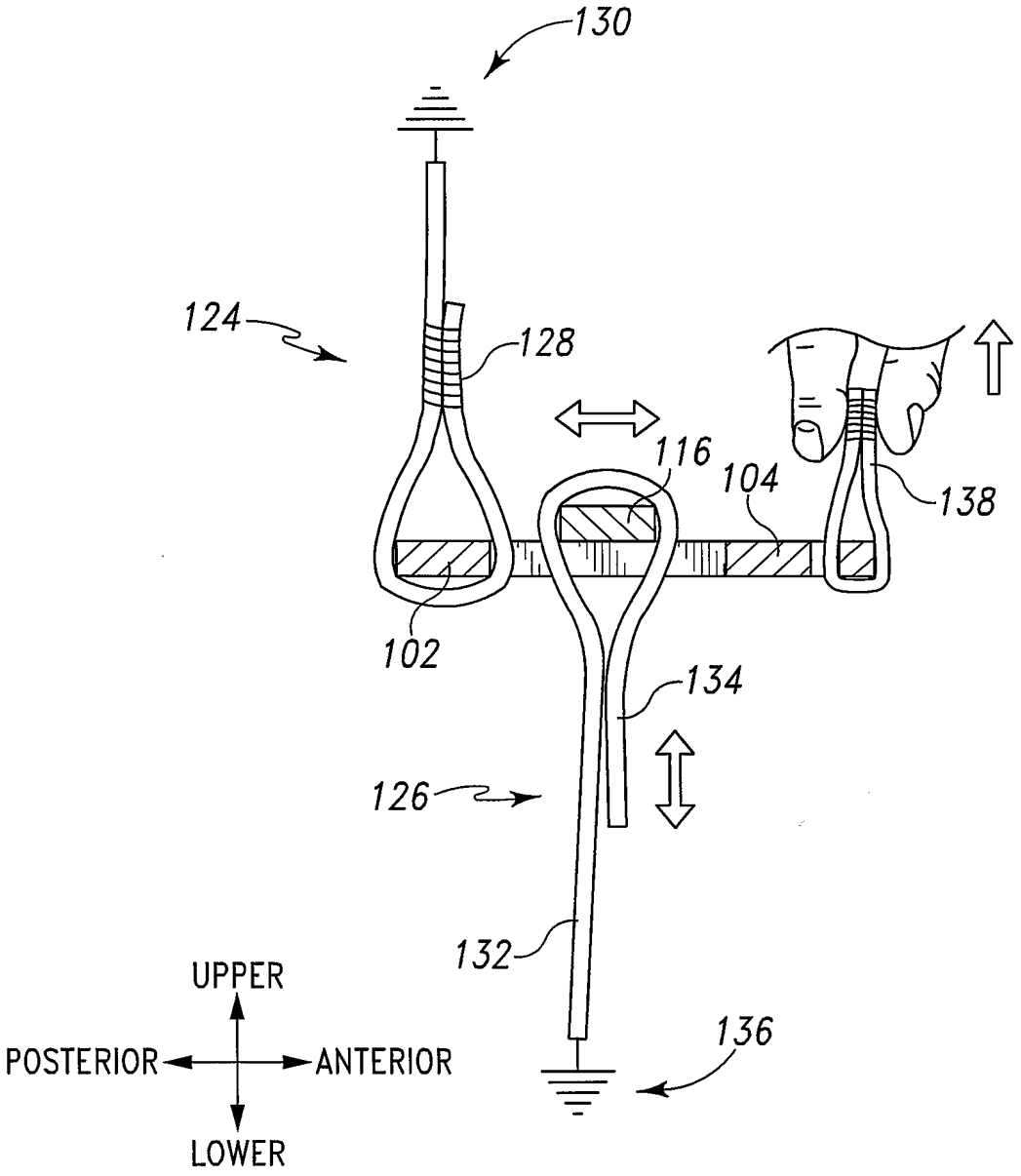
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Fig. 6